



## Missouri Department of Natural Resources

# Total Maximum Daily Load Information Sheet

## Clear Creek

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### Waterbody Segment at a Glance:

<b>Counties:</b>	Barry, Lawrence
<b>Nearby Cities:</b>	Monett
<b>Length of impairment:</b>	3 miles
<b>Pollutants:</b>	Nutrients
<b>Source:</b>	Monett Wastewater Treatment Plant



State map showing location of watershed

**TMDL Priority Ranking:** High

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### Description of the Problem

#### Beneficial uses of Clear Creek

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life
- Protection of Human Health associated with Fish Consumption

#### Use that is impaired

- Protection of Warm Water Aquatic Life

#### Standards that apply

- The impairment of Clear Creek is based on exceedence of the general criteria contained in Missouri's Water Quality Standards (WQS), 10 CSR 20-7.031 (3)(A) and (C). These criteria state:
  - Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses.
  - Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses.

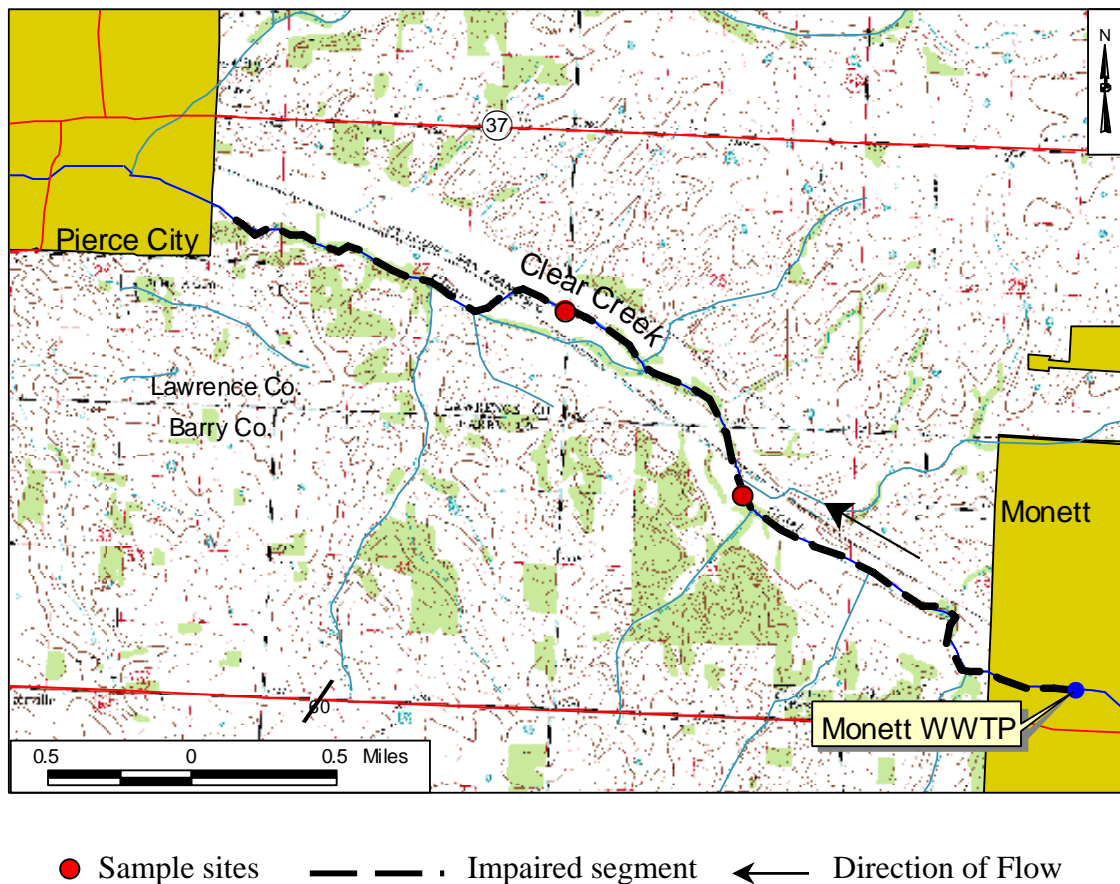
### Background Information and Water Quality Data

The Monett Wastewater Treatment Plant (WWTP) has experienced recurring mechanical problems, which have led to frequent exceedences of permit limits. Adding to the problem were sporadic, large discharges of wastewater from food processing industries within the city. The concern is the discharge of nutrients from the wastewater treatment plant. When water becomes rich in nutrients (like phosphorus and nitrogen), it results in an increase in plant life and algal blooms. Excessive algal growth is not only aesthetically unpleasant, it causes fundamental changes in a water ecosystem. Dissolved oxygen in the water can become depleted by algal respiration if large amounts of algae are

present in a stream. Low levels of dissolved oxygen can cause stress or mortality (death) in fish and other aquatic animals.

The Missouri Attorney General's Office initiated legal action against the city of Monett in December 1988 due to chronic noncompliance with permit limits. Water quality studies of Clear Creek in the 1980's and early 1990's showed that more stringent treatment requirements for the WWTP were needed. This resulted in an upgrade to the plant that was completed in 1996. Follow-up water quality studies conducted on the creek in 1999 and 2000 showed that ammonia, BOD and NFR levels were acceptable but that oxygen levels were still too low. Biological studies performed in 1997 and 2000 show that the aquatic invertebrate community in the creek is still impaired. According to the terms in the TMDL (which was approved by the U.S. Environmental Protection Agency in December, 1999), since water quality standards are not being met, this TMDL will be re-opened and Missouri will re-evaluate the loading capacity and allocations, as appropriate. Because ammonia, BOD and NFR levels are acceptable, they were removed as pollutants from the 2002 303(d) list. However, there are still problems with Clear Creek. These include excessive algal growth and low dissolved oxygen. Therefore, nutrients were added to the 2002 list as the pollutants of concern.

### Clear Creek in Barry County, Missouri, with Sampling Sites



The table below shows recent nutrient data from two locations on Clear Creek downstream of the Monett WWTP and also nutrient data from a nearby stream without a wastewater discharge, Center Creek at Hwy 97. The levels of nitrogen and phosphorus in Clear Creek are much higher than those in Center Creek at Hwy 97.

Nutrient Data for Clear Creek near Monett and a Control Stream, Center Creek at Hwy 97  
(All nutrient data is in mg/L)

Site Name	Year	Month	Day	NH3N	NO3N	TN	TP
Center Cr. @Hwy 97	2000	8	2	0.02499	4.18	4.7	0.03
Center Cr. @Hwy 97	2000	8	2	0.02499	4.2	4.7	0.03
Center Cr. @Hwy 97	2000	8	3	0.0499	4.21	4.7	0.01
Center Cr. @Hwy 97	2000	8	3	0.0499	4.08	4.6	0.01
Mean				0.037445	4.1675	4.675	0.02
Clear Cr. 1.5 mi.bl. Monett WWTP	1999	3	1				
Clear Cr. 1.5 mi.bl. Monett WWTP	1999	7		0.02499	12.7	13.2	16.7
Clear Cr. 1.5 mi.bl. Monett WWTP	1999	7		0.02499	11	11.5	16.7
Clear Cr. 1.5 mi.bl. Monett WWTP	1999	8	17	0.05	15.2	20.2	16
Clear Cr. 1.5 mi.bl. Monett WWTP	1999	8	17	0.06	11.4	12.3	15.9
Clear Cr. 1.5 mi.bl. Monett WWTP	1999	8	18	0.02499	12.7	13.2	16.7
Clear Cr. 1.5 mi.bl. Monett WWTP	1999	8	18	0.02499	12.8	13.8	17
Clear Cr. 1.5 mi.bl. Monett WWTP	2000	3	15	0.0499	15.7	17.75	10.1
Clear Cr. 1.5 mi.bl. Monett WWTP	2000	8	2	0.02499	18.6	20.6	18.4
Clear Cr. 1.5 mi.bl. Monett WWTP	2000	8	2	0.02499	15.9	17.9	19
Clear Cr. 1.5 mi.bl. Monett WWTP	2000	8	3	0.0499	16.6	17.1	18.6
Clear Cr. 1.5 mi.bl. Monett WWTP	2000	8	3	0.0499	13.8	14.3	16.9
Clear Cr. 1.5 mi.bl. Monett WWTP	2000	10	4	0.02499	17.2	17.7	23
Mean				0.0362192	14.4667	15.796	17.083
Clear Cr. 2.3 mi.bl. Monett WWTP	1999	7		0.02499	12.4	12.9	16.1
Clear Cr. 2.3 mi.bl. Monett WWTP	1999	8	17	0.09	15.4	18.3	15.2
Clear Cr. 2.3 mi.bl. Monett WWTP	1999	8	18	0.02499	11.9	12.9	15.9
Clear Cr. 2.3 mi.bl. Monett WWTP	1999	8	18	0.02499	12.4	12.9	16.1
Clear Cr. 2.3 mi.bl. Monett WWTP	2000	8	2	0.02499	17.8	18.8	16.4
Clear Cr. 2.3 mi.bl. Monett WWTP	2000	8	2	0.02499	18	18.5	17.8
Clear Cr. 2.3 mi.bl. Monett WWTP	2000	8	3	0.0499	15.6	16.1	16.4
Clear Cr. 2.3 mi.bl. Monett WWTP	2000	8	3	0.0499	15.5	16	17.2
Mean				0.0393437	14.875	15.8	16.388

Source: Missouri Department of Natural Resources

NH3N=Ammonia an nitrogen;NO3N=Nitrate as nitrogen;TN=Total nitrogen;TP=Total phosphorus

For more information call or write:

Missouri Department of Natural Resources

Water Protection Program

P.O. Box 176, Jefferson City, MO 65102-0176

1-800-361-4827 or (573) 751-1300 office

(573) 522-9920 fax

Program Home Page: [www.dnr.mo.gov/env/wpp/index.html](http://www.dnr.mo.gov/env/wpp/index.html)